

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the term “includes” suggests that the monomers are present in the copolymer which renders the claim inaccurate. The copolymer is a product of polymerization of the two monomers, thus the final form of the copolymer cannot contain these starting monomers. It's suggested that the term “obtained from” or similar terminology be replaced for the term “includes”.

In claim 10, it is unclear how a nanotube can function as an electronic circuit molecular device.

In claim 12, the term “strong base” renders the claim indefinite. The term “strong” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Other claims are deemed indefinite in view of their dependency on claim 1 or claim 12.

***Claim Rejections - 35 USC § 102/103***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over MORIGUCHI et al (“Micelle-Templated Mesophases of Phenol-Formaldehyde Polymer”).<sup>1</sup>

Claims 1-4: Moriguchi teaches phenolic polymer nanotubes prepared from polymerization of phenol and formaldehyde monomers. See Moriguchi, page 1171, first column, third and last paragraphs. The diameter of the nanotube ranges from 2.9

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<sup>1</sup> Cited by Applicant.

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(29A°) to 3.7 nm (37 Å) (page 1172, first column). Moreover, the Moriguchi method of making the phenolic polymer nanotubes is identical to the method of the claimed invention (as discussed in the rejection of claims 12-14 below); therefore, it's necessarily inherent that the nanotubes resulted from Moriguchi method possess the same dimensions as claimed. In the alternative, Moriguchi teaches that the dimensions of the nanotubes can be varied by varying the alkyl chain length of the surfactants (see Moriguchi, page 1172, first column); therefore, one of ordinary skill in the art would have found it obvious to vary the dimensions of the nanotubes depending on the end use of the nanotubes.

Claims 5-11: The intended use of the claimed nanotubes as recited in claims 5-11 does not amount to patentable limitation. In the alternative, the uses of polymer nanotubes in the manner as claimed are known in the nanotube art; for example, see JP patents: JP 07-048,451; JP 08-333,402 or JP 09-216,815.<sup>2</sup> Therefore, one of ordinary skill in the art would have found it obvious to utilize nanotubes in the applications as claimed.

Claim 12: See Moriguchi, page 1171, first column, last paragraph to second column, first paragraph.

Claim 13: See Moriguchi, page 1171, second column, first paragraph.

Claim 14: See Moriguchi, page 1172, second column, first paragraph where heating at 110°C is suggested.

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<sup>2</sup> Provided by Applicant.

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7. Claims 1-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over UOTA et al (“Synthesis of Phenol/Furfural Polymer Nanotubes”) or over FUJIKAWA et al. (“Synthesis and Properties of Phenol/Furfural Nanotubes Templated by Surfactant Assemblies”).<sup>3</sup>

Claims 1-4: UOTA and FUJIKAWA each teaches a method of making phenolic polymer nanotubes having an internal diameter from 2-3 nm and outer diameter of about 6 nm, which leaves a thickness of about 3-4 nm. See UOTA, page 48; and FUJIKAWA, page 1, paragraph 1 (English translation copy). Moreover, the UOTA or FUJIKAWA method of making the phenolic polymer nanotubes is identical to the method of the claimed invention (as discussed in the rejection of claims 12-14 below); therefore, it’s necessarily inherent that the nanotubes resulted from UOTA or FUJIKAWA method possess the same dimensions/structure as claimed. In the alternative, one of ordinary skill in the art would have found it obvious to vary the dimensions/structure of the nanotubes depending on the desired end use of the nanotubes.

Claims 5-11: The intended use of the claimed nanotubes as recited in claims 5-11 does not amount to patentable limitation. In the alternative, the uses of polymer nanotubes in the manner as claimed are known in the nanotube art; for example, see JP patents: JP 07-048,451; JP 08-333,402 or JP 09-216,815.<sup>4</sup> Therefore, one of ordinary skill in the art would have found it obvious to utilize nanotubes in the applications as claimed.

Claims 12-14: See UOTA, page 48; and FUJIKAWA, paragraph 2 (English translation copy).

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<sup>3</sup> Cited by Applicant.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 9:30 a.m. to 6:00 p.m., Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. Thi Le/  
H. (Holly) T. Le  
Primary Examiner  
Art Unit 1794

June 7, 2008

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<sup>4</sup> Provided by Applicant.